

NAVAL BASE PHILADELPHIA-
PHILADELPHIA NAVAL SHIPYARD,
STRUCTURE NO. 841

HAER NO. PA-387-AA

Delaware Avenue, Between Fourth Street East and Webster Avenue
League Island
Philadelphia
Philadelphia County
Pennsylvania

HAER
PA
51-PHILA,
709AA-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, Pennsylvania 19106

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Location:

Delaware Avenue between Fourth Street East
and Webster Avenue, League Island,
Philadelphia, Philadelphia County,
Pennsylvania

USGS Philadelphia, PA Quadrangle
Universal Transverse Mercator Coordinates
18/4415376 N/476000 E

Date of Construction:

1921

Engineer:

Unknown

Architect:

Kirby Smith

Present Owner:

Naval Surface Warfare Center Carderock Division - Ship
Systems Engineering Station

Present Use:

This structure, a water tank, is currently disused.

Significance:

Structure 841 was constructed in 1921 as a 100,000-gallon water tank. This steel structure is representative of infrastructure built to service the Naval Aircraft Factory. Its design is typical of water towers built during the early 20th century. The materials used in its construction may reflect the effect of post-war demobilization on the Naval Aircraft Factory's budget. The structure has not been altered.

Project Information Statement:

Structure 841 is proposed for demolition due to structural instability. To mitigate this adverse effect on the structure, the Pennsylvania SHPO stipulated documentation of the structure prior to demolition.

Project Historians

Steven Bedford Ph.D. and Kristin Fetzner of TAMS Consultants, Inc. 655 Third Avenue New York, NY 10017. February 1998.

Summary Description of Structure 841

Located on Delaware Avenue, west of Building 77H and south of Building 87, Structure 841 consists of a 100,000-gallon cylindrical water tank supported by angled steel legs. The entire structure is approximately 193 feet high, topped by a wind direction and air-speed indicator. The entire superstructure rests on a 36-foot-square concrete foundation that consists of corner piers connected by grade beams. Each leg is secured to each corner pier by a steel base plate and riveted gusset plate. The four legs are connected at their bases by beams made up of three steel channel sections riveted together to form a T shape. Each of the tank's four legs is box-shaped and is made up from two steel channel sections connected by a steel plate on the inside of the leg, and diagonal strapping on the outside of each leg. All connections are riveted.

Horizontal bracing of the structure is provided by built-up beams placed horizontally at the tower's quarter points, creating six panels. Further horizontal stability is provided by diagonal bracing consisting of threaded steel rods with tumbuckles connected to steel tension rings that encircle the downpipe casing at each level. Similar diagonal bracing links the horizontal bracing on all four sides of the structure and at each level. The legs of the tower are riveted to the 30-foot-diameter steel water tank and are surmounted by a three-foot-wide metal walkway ringing the tank. The walkway has a three-foot-high metal pipe railing and is reached by partially enclosed ladders that run up the southeast and northwest legs of the tower. The bottom of the water tank is hemispherical and can be reached via an inspection platform that is suspended from the tank and the northeast leg. The top of the water tank consists of a conical roof topped by a wind direction and air-speed indicator that no longer works. The top of the tank can be reached by a partially enclosed ladder that rotates on a central pivot at the top of the roof. A two-foot diameter pipe casing, covering two 3-inch supply pipes and a twelve-inch return pipe, links the tank to the valve house (Building 523), which is located directly beneath the tower.

Historical Background

Structure 841 is an example of the type of additional infrastructure built to service the Naval Aircraft Factory during and immediately after World War I. Structure 841 helped maintain a constant water supply to buildings relating to the Naval Aircraft Factory, particularly the adjacent heating plant. It has retained its original use as a water storage facility until recently. The increased use of water at the base caused by the influx of thousands of aircraft plant personnel necessitated its construction.

Of particular interest is the material used in the construction of the tank's support structure. The legs and the horizontal bracing are built up from relatively small rolled steel sections that were not commonly used in tower construction. Typically, the horizontal members of such a tower would

NAVAL BASE PHILADELPHIA-
PHILADELPHIA NAVAL SHIPYARD,
STRUCTURE 841
HAER No. PA-387-AA
(Page 3)

consist of rolled steel I-sections instead of being built up from smaller steel channels. The open box effect of the legs, while ingenious in that it provided a means for rainwater to drain out, reducing rust, also seems rather *ad hoc* in technique. The use of such materials and construction methods may have been occasioned by steel shortages at the end of the war. It may also have been that there was probably an abundance of material of this small size left over from ship fabrication and it was put to economical use in an era when larger rolled steel sections were more expensive than the labor required to create the same steel profile through riveting. Regrettably very little documentation on this simple structure has survived, making it impossible to put this issue to rest.

This elevated storage tank is typical of World War I-era tanks. Between World War I and World War II the size of the storage tanks generally increased in order to supply the growing populations housed at the naval installations. This is exemplified by the narrow diameter of this tank as compared to World War II-era tanks, which were often twice as wide as Structure 841.

BIBLIOGRAPHY

A Cultural Resources Survey of the Naval Complex of Philadelphia prepared by John Milner Associates, Inc. 1994.

R. Christopher Goodwin & Associates, Inc. *Support and Utility Structures and Facilities (1917-1946): Overview, Inventory, and Treatment Plan*. Prepared for Department of the Navy, Atlantic Division, Naval Facilities Engineering Command, 1995.

NAVAL BASE PHILADELPHIA-
PHILADELPHIA NAVAL SHIPYARD, STRUCTURE 841
HAER NO. PA-387-AA
Site Plan
(Page 5)

